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ABSTRACT

This investigation reports the development of a measure of adolescent connectedness and estimates of its psychometric properties. A measure was developed to assess the ecological and developmental dimensions of adolescent connectedness, defined as adolescents' caring for and involvement in specific relationships and contexts within their social ecology. Exploratory and confirmatory factor analyses in studies one and two yielded theoretically consistent factor solutions. These models were cross-validated in studies three and four with three geographically and ethnically diverse adolescent samples totaling 1454 adolescents. The measure of adolescent connectedness demonstrated satisfactory inter-item and test-retest reliability and convergent validity across samples. Consistent with social control and problem-behavior therapy, two higher order factors emerged across all of these samples: conventional vs. unconventional connectedness. These two dimensions of connectedness were found to differentially explain substance use for delinquent and non-delinquent adolescents. Using this ecological assessment, adolescent connectedness appears to differ as a function of age, sex, and problem-behavior status; varies across relationships and contexts; reflects wither conventional or unconventional behaviors and attitudes; and can explain engagement in risk-taking behaviors. (Contains 62 references and 6 tables.) (Author)

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The Hemingway: Measure of Adolescent Connectedness: Validation Studies

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Running Head: ADOLESCENT CONNECTEDNESS

Measuring Connectedness Across the Adolescent's Social Ecology: Five Validation Studies

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Abstract

This investigation reports the development of a measure of adolescent connectedness and estimates of its psychometric properties. A measure was developed to assess the ecological and developmental dimensions of adolescent connectedness, defined as adolescents' caring for and involvement in specific relationships and contexts within their social ecology. Exploratory and confirmatory factor analyses in studies one and two yielded theoretically consistent factor solutions. These models were cross-validated in studies three and four with three geographically and ethnically diverse adolescent samples totaling 1454 adolescents. The measure of adolescent connectedness demonstrated satisfactory interitem and test-retest reliability and convergent validity across samples. Consistent with social control and problem-behavior theory, two higher order factors emerged across all of these samples: conventional vs. unconventional connectedness. These two dimensions of connectedness were found to differentially explain substance use for delinquent and non-delinquent adolescents. Using this ecological assessment, adolescent connectedness appears to differ as a function of age, sex, and problem-behavior status; varies across relationships and contexts; reflects either conventional or unconventional behaviors and attitudes; and can explain engagement in risk-taking behaviors.

Measuring Connectedness Across the Adolescent's Social Ecology: Five Validation Studies

In our increasingly urbanized, mobile, and globalized society, tensions occur between experiences of alienation, independence, and autonomy on the one hand, and social connection, relatedness, and interdependence on the other (Bellah, Madsen, Sullivan, Swindler & Tipton, 1985; Fromm, 1955; Jason & Kobayashi, 1995). Recently, as the United States approached the 21st century, the media highlighted repeated signs of disconnection and alienation. In the 1990s, the public was shocked by stories about youths involved in school shootings. The youths involved in school shootings were described as disconnected and alienated. Yet little is known about connectedness among youth, how it manifests beyond the family, or how best to operationalize, measure, or study the phenomenon of adolescent connectedness.

The current series of investigations tested the principles of a framework of adolescent connectedness based on Baumeister and Leary's (1995) belongingness hypothesis and Jessor and Jessor's (1977) theory of problem behavior. Baumeister and Leary suggest that connectedness, as caring and frequent activity, follow from the need to belong. Jessor and Jessor suggest that the adolescent social ecology—the people, places, and things that youth care for and do frequently--can be characterized in terms of conventional and unconventional attitudes and activities. Given the absence of consistent definitions or measures of adolescent connectedness, an overview of the extensive work on connectedness and its measurement among adults is presented first, followed by and explanation for why adult characterizations and measurements of connectedness may be of limited use with adolescents. A framework for integrating several theories related to adolescent connectedness, including the belongingness hypothesis and problem behavior theories, is presented, and from this framework four hypotheses are presented and tested through a series of studies using a newly developed measure of connectedness.

Connectedness Among Adults and Late Adolescents

The adolescent literature lags behind the adult literature in terms of providing consistent definitions of connectedness. In the adult literature, connectedness has been described as a feeling of belonging and relatedness to others, and as the extent to which one values relationships and is sensitive to the effects of his or her actions on others (Harter, Waters, Pettitt, Kofkin, & Jordan, 1997; Rude & Burnham, 1995). Most research on connectedness with young adults has viewed *social connectedness* as a psychological disposition or a personality trait that reflects one's sense of belonging to the larger society (Lee & Robbins, 1995) or of relatedness to others within the larger world (Hagerty, Lynch-Sauer, Patusky, & Bouwsema, 1993). Lee and Robbins (1995) described the absence of connectedness as "a general emotional distance between self and others that may be experienced even among friends or close peers" (p. 236). They suggested that disconnected individuals may "have been frustrated from receiving appropriate empathy or understanding from peers or society, perhaps along the transition from adolescence to adulthood" (p. 236). These and other researchers (Hagerty et al., 1993; Lee & Robbins, 1995, 1998; Lee & McCarthy, 2000) suggest that over time and through experiences in the world, adults come to develop an enduring disposition towards the world that leads them to expect either (1) a sense of belonging with others or (2) disconnection and rejection from others. Thus, social connectedness is likely borne out of the experiences children have within their families. These early experiences create expectations that adolescents carry with them into the wider adolescent social ecology of friendships, relationships with teachers and peers, and engagement in school activities. Unfortunately, however, there is no existing measure of adolescent connectedness, an ecological view, viewed by many as central to understanding the adolescent experience, is not common in the connectedness research conducted with adults.

There are at least three reasons why adult self-report measures of social connectedness and belonging may be inappropriate for youth. First, adult assessments of connectedness characterize it as an enduring personality trait (Lee & Robbins, 1995), yet it is generally viewed as inappropriate to ascribe rigid or fixed personality traits to adolescents. Adolescent personalities are still developing (Weiner, 1992). This may explain why research on adolescent connectedness rarely describes connectedness as a personality trait, but rather as a state that reflects a youth's situational involvement in relationships and feelings for others (Cooper, 1999; Noam, 1999).

Second, social connectedness among adults is more often described as a generalized sense of belonging or relatedness (Lee & Robbins, 1995; Fishler, Sperling, & Carr, 1990), whereas research on adolescents has focused on connectedness as engagement within specific relationships and contexts (Bonny, Britto, Klostermann, Hornung, & Slap, 2000; Cooper, Grotevant, & Condon, 1983; Jacobson & Rowe, 1999). Unlike in the adult literature, the adolescent literature on connectedness connotes ecological specificity (e.g., related to school or to family). Measures of connectedness for adults would be inconsistent with this ecological definition, which may explain why measures of adolescent connectedness are so often created (or adapted from other scales) for the purpose of a given study (e.g., Allen et al., 1994; Bonny et al.; Jacobson & Rowe; Resnick et al., 1997; King, Vidourek, Davis, & McClellan, 2002).

Third, research on adolescent connectedness has not come to a consensus about whether connectedness is better characterized in terms of youths' social cognitions (e.g., reciprocity in perspective taking), their interpersonal conduct, or their disposition toward caring for other people and places (Bengtson & Grotevant, 1999; Cooper, 1999; Prawat, 1989; Fishler et al.,

1990; Resnick et al., 1997). Clearly, given the diversity of descriptions of adolescent connectedness, an adolescent specific framework should be developed and empirically tested.

Towards the Measurement of Adolescent Connectedness

A validated measure of adolescent connectedness is needed because, using varying operational definitions, research has demonstrated that connectedness is critical to adolescents' social development. Adolescents' connectedness has been found to predict psychological (i.e., role taking and identity) development and physical health (Bonny et al., 2000; Cooper et al., 1983; Hendry & Reid, 2000; Resnick et al., 1997). Connectedness has been shown to explain to risk-taking behaviors (Bogenschneider, Wu, Raffaelli, & Tsay, 1998; Bonny et al., 2000; Dryfoos, 1991; Hawkins, Catalano, & Miller, 1992) depression (Jacobson & Rowe, 1999) and violence (Karcher, 2002), which suggests that connectedness could be an important target for intervention programs.

Much of the available research on connectedness among adolescents has used self-assessments that measure both youths' interest in or caring for specific people and places and youths' active engagement in these relationships and contexts. Yet, there are no rigorously validated self-report measures of connectedness for adolescents. One line of research on connectedness in adolescence has been based on observer ratings of the parent-child interactions (Bengtson & Grotevant, 1999; Clark & Ladd, 2000; Cooper et al., 1983). Grotevant and Cooper (1998) have described adolescents' connectedness to the family as the movement toward more reciprocal and mature relationships with parents during a period of identity development and increased involvement with peers. Yet their measurement of parent-child connectedness cannot be applied outside of the family, and many studies of adolescent connectedness have examined it across the larger adolescent social ecology, specifically focusing on connectedness to teachers

and to school. Most other studies have used ad hoc self-report scales for the purposes of a study or adapted from scales designed to measure other phenomena (Blatt, Zohar, Quinlan, Luthar, & Hart, 1996; King et al., 2002). What is needed is a self-report (that is, easy to administer) measure of youths' connectedness across their social ecology that includes scales measuring connectedness to friends, one's neighborhood, one's school, teachers, peers, and the like.

The availability of an ecological, self-report measure of connectedness, particularly if it was a self-report and easy to administer, would allow researchers and evaluators to assess the impact of large-scale programs and curricula for adolescents. In fact, definitions of adolescent connectedness frequently have been borne out of intervention approaches designed to promote connectedness (or what researchers have described as similar variables, such as bonding and relatedness). These definitions of connectedness have emphasized either social cognition, behavior, or caring. Programs providing information that is expected to promote connectedness to school or to peers often describe connectedness in terms of mature social cognitions and positive conventional beliefs (Hawkins & Weiss, 1985; Simmons-Morton, Crump, Haynie & Saylor, 1999). Programs that focus on social skills development and on increasing youths' behavioral involvement in specific conventional contexts (like school) and conventional relationships (like with family) have used youths' prosocial conduct and the frequency of contact as the main indicators connectedness (e.g., Jason & Kobayashi, 1995; Noble & Gibson, 1994; Rook, 1984). Finally, programs involving youths in caring relationships, like mentoring or tutoring, often view cooperative behaviors and mature forms of caring as indicators of connectedness (Allen et al., 1994; Karcher, Davis, & Powell, 2002; King et al., 2002). Clearly research is needed on the ways in which in which youth actually experience and describe connectedness, because there is no commonly accepted definition of adolescent connectedness.

Baumeister and Leary (1995) suggest that connectedness reflects frequent contact and persistent caring. This may provide a starting point for testing the nature of adolescent connectedness.

A Framework for Measuring Adolescent Connectedness

To provide a framework for measuring adolescent connectedness, I reviewed the literature describing adolescent connectedness. The most commonly cited concepts were belonging, relatedness, and attachment. Also prominent were descriptions of conventional versus unconventional social involvement and prosocial versus antisocial bonding. This literature provides some operational definitions for connectedness and related constructs. It can be said that belonging reflects a feeling of acceptance within a group and relatedness reflects a feeling of closeness and acceptance from individuals, whereas connectedness, like bonding, connotes the youths' engagement with people and within specific places. Unlike, belongingness and relatedness which reflect the experience of feeling included and cared for, connectedness reflects youths' movement toward and engagement in relationships and contexts. From this literature review, four hypotheses were chosen to guide my efforts to define and to measure connectedness across the adolescent social ecology.

The first hypothesis was that adolescent connectedness is context and age specific. I assumed that patterns of adolescent connectedness would change over time and reflect evolving age-specific kinds of engagement in specific contexts and relationships. Nakkula and Selman (1991) argued that adolescence may best be understood by exploring youths' developing interpretations of their connectedness to their world over time. This is consistent with much of the literature on adolescent connectedness that focuses on specific contexts of the adolescent's social ecology (e.g., Cooper et al., 1983; Bonny et al., 2000). In fact, both Cooper (1999) and Nakkula and Selman (1991) referred to these as *worlds of connectedness* that change over time.

The second hypothesis of this framework was that connectedness reflects a response to one's need to belong. Baumeister and Leary's (1995) belongingness hypothesis states that the need to belong is fundamental to human existence. Baumeister and Leary argued that this need leads individuals to seek out "frequent interaction and persistent caring" (p. 497). Based on this, I expected that self-reported connectedness involving interaction and caring would not be highly related to adolescents' cognitive appraisal of their own maturity or reciprocity in relationships (e.g., Cooper, Grotevant, & Condon, 1983) or by their knowledge about others or the world; rather I expected that the phenomenon of adolescent connectedness would be better characterized by their self-reported involvement (interaction) with others and caring for others. Based on the belongingness hypothesis, this was expected because behavioral involvement and caring help adolescents' meet their own needs for belonging (Noam, 1999; Sullivan, 1953).

The third hypothesis was that connectedness could be characterized in terms of conventionality. Problem-behavior theory (Jessor & Jessor, 1977) draws distinctions between conventional and unconventional activities and relationships in adolescents' environments. If adolescents' relationships, contexts, and activities reflect different ecologically specific *worlds of connection*, then conventional worlds of connectedness (like the family, religion, school) can be said to reflect relationships, places, and even activities that are mediated or sanctioned by adults. Conversely, behavior in unconventional worlds (such as when one is with playing with friends or hanging out in the neighborhood) does not tend to be structured or guided by conventional norms for behavior. Connectedness in these contexts is peer mediated or driven by norms prescribed by youths and their friends. Jessor (1984) argued that adolescent problem behaviors (e.g., drinking, delinquency, sexual behaviors) can be explained as a function of youths' involvement in these unconventional worlds. The theory holds that problem behaviors increase when conventional

connectedness with school and family are low and involvement in unconventional relationships, such as with friends or in others in one's neighborhood, is high. Thus, I expected conventional and unconventional connectedness to differentially explain risk behaviors, like substance use.

The fourth hypothesis was that gender differences in connectedness would appear, as is predicted from individuation theory (Grotevant & Cooper, 1986; Youniss & Smollar, 1985). In contrast to the idea that adolescents must fully separate or disconnect from their families during adolescence, individuation theory holds that during adolescence family connectedness reflects a transformation of adolescent-parent relations, towards greater reciprocity and mutuality (rather than a weakening), at the same time that adolescents' connectedness to friends and to other unconventional worlds increases. Yet, it has been argued that the processes of individuation are less pronounced for females because girls are encouraged to maintain closeness to family and are more strongly discouraged from engaging in unconventional behaviors (Chodorow, 1978; Lang-Takac & Osterwiel, 1992), both of which serve to increase girls' conventional connectedness and decrease unconventional connectedness.

Based on these four principles, I hypothesized that adolescent connectedness (a) would be specific to each world in the adolescents' social ecology (e.g., school, family, friends); (b) would differ between the sexes and between preadolescents and adolescents with boys and older youth reporting more unconventional connectedness; (c) could be characterized in terms of conventionality that explained risk-taking behaviors.

Plan of Analysis

The purpose of the current series of studies was to develop and validate a measure of adolescent connectedness. Procedures described by Dawis (1987) were followed for measurement construction and procedures described by Hull, Lehn, and Tedlie (1991) were

followed for measurement testing with latent variable modeling. In an effort to estimate the validity and to strengthen the generalizability of the measure (Mook, 1983), several different adolescent samples were recruited for the five studies.

Five studies were conducted to test the four hypotheses of the connectedness framework. In the initial measurement development steps in study one I asked adolescents in focus groups to identify contexts of connectedness and to generate items. An initial test of these items was conducted with a sample of preparatory school students from the Southwestern U.S. These items were subjected to a principal components analysis, which resulted in tentative subscales. Using these subscales statistical tests of the effects of age, the presence of ecological differentiation, and an initial test of conventionality in connectedness were conducted. In study two, the conventionality constructs presented in study one were tested with a multiethnic sample of urban delinquent adolescents. In study three, additional items were developed for the measure subscales derived in study one to increase subscale reliability, and the revised measure was used to examine the relationships between both conventional and unconventional connectedness and substance use. A theorized model of the different effects of conventional and unconventional connectedness was tested with urban, delinquent youths and then was cross-validated with Midwestern Caucasian youths. Study four tested the hypothesized ecological structure of the revised composite scales of family, school, friends, and self to provided evidence of convergent validity with an ethnically geographically sample high school students. In study five, analyses of variance were used to estimate mean differences on connectedness scales between boys and girls, and between delinquent youths and non-delinquent youths as tests of discriminant validity.

Study One: Measurement Development and Initial Validation of Framework

The purpose of study one was to understand the nature of adolescent connectedness from the adolescent's point of view and to develop and test items for an initial measure of adolescent connectedness. Initial factor analyses determined the contributions of knowledge, conduct, and caring to adolescents' understanding of connectedness (Prawat, 1989). By examining the factor loadings of items reflecting (a) knowledge about, (b) involvement with, and (c) caring for others I was attempting to test Baumeister and Leary's (1995) hypothesis that connectedness, as a core human responses to the need to belong, was best characterized by frequent contact and persistent caring for other people and places.

The second goal was to test for the presence of an underlying ecological structure of adolescent connectedness. I expected that, if adolescent connectedness is a generalized phenomenon then, when factor analyzed those items tapping into connectedness in different social contexts would load on one general factor. Conversely, separate loadings of the context-specific items on context-specific factors would support a more ecological characterization of connectedness and would indicate the need for an ecologically specific measure of adolescent connectedness.

The third goal was to generate a preliminary estimate of differences in connectedness between preadolescents and adolescents. Older adolescents were expected to report greater unconventional connectedness (Jessor, 1993) such as to friends (Sullivan, 1953). Thus, if mean levels of connectedness were found to differ for preadolescents and adolescents, then connectedness may reflect a developmental construct that changes over time, and which may therefore be more amenable to change through school interventions or curricula.

The fourth goal was to explore conventionality as a super ordinate construct in explaining adolescent connectedness. Testing problem-behavior theories (Hirschi, 1969; Jessor & Jessor, 1977), it was expected that, if context specific factors or subscales emerged, each would differentially load on one of the two factors reflecting conventional (i.e., adult mediated activities and relationships) or unconventional (peer mediated) connectedness.

In sum, I hypothesized that connectedness would be context-specific, characterized by "frequent interaction and persistent caring," different for preadolescents and adolescents, and characterized by conventionality. Each of these hypotheses was tested separately.

Method

Design

The first study included exploratory and confirmatory factor analyses. Three focus groups were organized to define connectedness contexts and to develop and review items. Two including adolescents at a summer camp, and one of graduate students to assess content validity. Once a satisfactory item pool was developed, the first survey was given to a large sample of youths and exploratory factor analyses were conducted. Item loadings were inspected identify core items reflecting adolescent connectedness. Factor-derived subscales were computed and discriminant function analysis was used to see if a linear combination of connectedness subscales could be used to discriminate between older and younger adolescents. Finally, confirmatory factor analysis was used to test the degree to which each factor-derived subscale loaded on latent variables reflecting conventional and unconventional connectedness.

The measurement development began by asking adolescents in focus groups in a summer mentoring program to respond to the following question based on the definition provided by Nakkula and Selman (1991): "If someone told you that to understand adolescents one needs to

ask them for their interpretations of their connectedness to the world over time, what would you think that person was talking about, and what kinds of examples of connectedness can you think of that are important in your life?" The youths identified 10 general contexts of connectedness and people with whom they actively are connected. Their responses were further broken down into 13 worlds: connectedness to friends, peers, parents, siblings, teachers, school, reading, neighborhood, religion, culture, self, and the future. I developed item sentence stems that reflected cognition, activity, and caring in on these 13 worlds. These items were reviewed by the 48 early adolescents at the same summer program. The youths identified eight items that did not make sense or that were poorly worded. A group of master's students at the Harvard Graduate School of Education then attempted to sort the remaining 42 items in this first version into their respective worlds (e.g., school, self, reading) and dimensions (e.g., knowledge, caring). In the end, a set including 39 of the original items was retained in version two.

Participants

Three focus groups were conducted, one with 18 adolescents and one with a group of several masters level graduate students in psychology. The adolescents were volunteers in a summer mentoring program. The graduate students were selected because of their expertise and interest in adolescent development. The third focus group included forty-eight youths at a summer camp, ages 11 to 17, who were asked to review items for clarity.

The survey population included 635 children in grades 6 through 12 in a private school in the Southwest. The sample was 66.5% female, 33.5% ethnic minority youths (11.6% African-American; 7.7% Mexican-American; 6.8% Asian, 4.4% Biracial, and 3% reporting "Other" descent). The percentage of youths of each age was balanced across ages 10 (2.6%), 11 (10.6%),

12 (11.2%), 13 (11.1%), 14 (14.8%), 15 (14.4%), 16 (15.4%), 17 (14.4%), and 18 (5.5%). The confirmatory factor analysis only the adolescents who were age 14 or older.

Measures

The Measure of Adolescent Connectedness (MAC: version 1). This scale included 47 items reflecting either social cognition, conduct, or caring in the social worlds to which the focus group participants said youth felt connected (see below): parents, siblings, teachers, peers, school, future, culture, reading, religion, friends, neighborhood, and self (described by youth as knowing, liking, and being oneself and in control of oneself. From an ecological perspective, these worlds include relationship microsystems (parents, siblings, peers, teachers, and friends), including both self-cohesion, and self-esteem), larger social ecology microsystems (school, neighborhood, culture, and religion), as well as the connectedness to self construct and a microsystem activity, reading. The connectedness to self construct was maintained because adolescents do develop a sense of self during adolescence that they react to and have feelings about. Reading also was included as a world because some youth felt that the world of reading (e.g., being able to escape in a book) reflects a world they choose or choose not to go to and be active in. Sample items reflecting these three dimensions of social cognition, conduct, and caring in the domain of connectedness to religion included, "Most people know more about religion than I do," "I attend a religious service (like synagogue or church) at least once a month," and "My religion is very important to me." The social cognition items were generated to reflect reciprocity and maturity as described in individuation theory to as indicators of connectedness (e.g., Cooper et al., 1983): "Good friends always agree with each other," "I usually try to take my parents' point of view when we disagree," and "I know how to get along with the adults in my family (like my parents)." Examples of conduct items included "I put as

little effort into my school work as I can." and "I always try hard to earn my teachers' trust." These were the items submitted to the factor analysis. The items were responded to using a Likert-type response scale ranged from "never/not at all" (1) to "always/very much" (5).

Procedures

Using the second version of the measure, an exploratory analysis was conducted using SPSS software. Principal components analysis with oblique rotations was chosen because (a) it was assumed that the resulting factors of connectedness would be correlated, and (b) using an orthogonal (e.g., Varimax) rotation could artificially force ecological differentiation. The confirmatory factor analysis was conducted with EQS 5.6 for Macintosh (Bentler & Wu, 1995).

Results

In summary, the exploratory factor analysis (N = 637) revealed that items loaded on ecologically specific factors, not on one general factor. The activity/conduct and caring items loaded most heavily on these factors. Two discriminant function analyses similarly revealed that younger adolescents (under age 15) differed in systematic ways from older adolescents (15 or older) on the factor scales, with older youths reporting more unconventional connectedness. The confirmatory factor analysis supported the presence of two higher order factors reflecting conventional and unconventional connectedness.

It was hypothesized first that distinct, context-specific worlds of connectedness (i.e., factors) would emerge rather than a general, single factor. As predicted, ecologically distinct factors emerged that were clearly related to specific social ecologies and relationships in adolescents' lives. The exploratory factor analysis using scale version two resulted, after 15 iterations, in 14 factors with eigenvalues greater than 1.0. The oblique factor loadings in the pattern matrix were examined to determine the ecological specificity of adolescent

connectedness (see Table 1). In all, 73% of the items loaded on the scales to which they were intended at a level of .30 or greater. The moderate .30 cutoff value was used because of expected measurement error due to the early phase of item development (Dawis, 1987). Ten of the factors were easily interpretable by the collection of ecologically homogenous items (e.g., all three items were about connectedness to siblings or to religion, etc.; see Table 1). Three other factors could not be interpreted clearly. Two included only one item (caring for friends; knowledge about peers). One included only two items from separate scales for which no underlying construct could be identified. One of the factors subsumed 11 of the school, teacher, peers, and future items (see Factor 1, Table 1). Therefore a separate, second order factor analysis was conducted on these items, which revealed four separate factors: two for school/future (positively worded items on one, negatively worded items on the other), one for teachers, and one for peers (see Table 2). The school and future items were separated and computed as distinct worlds. This provided thirteen context-specific factors, the subscales of which were computed using item means.

The second hypothesis, that the caring and conduct items would contribute most to the underlying structure of adolescent connectedness, was supported. Factor loadings were examined to assess how knowledge, conduct, and caring items contributed to the connectedness factors. Two indicators were examined: (a) the average communality (or total factor loading across all factors) for the items reflecting each of the three dimensions, and (b) the intercorrelation among items in each dimension (Cronbach's alpha). The average communality for the items in each dimension was .33 for cognition items, .47 for conduct items, and .53 for caring items, suggesting the cognition items contributed the least to the separate factors. The alpha coefficients for these three item groupings were .49 (cognition), .53 (conduct), and .66 (caring), suggesting

that as a set the cognition items had the lowest interitem correlations. Finally, it appeared that two of the four cognition items with large communalities reflected behavioral content ("I know how to get along with my parents." and "Doing well in school will help me get the things I want out of life."). These findings suggest the social cognition (knowledge) items were not as reflective of the factors measuring adolescent connectedness as the conduct and caring items.

To conduct the following statistical analyses, the items loading on each factor were averaged to create that subscale. To provide more reliable estimates for the factor analyses, composite scales were computed by pooling items from related subscales: the Family composite included sibling and parent items, the School composite included teacher and school items, the Self composite included the self-esteem and self-cohesion items; and the Friend composite included neighborhood and friend items (see Table 1).

The third hypothesis, that levels of connectedness would differ across adolescence, received support from two discriminant function analyses. The first discriminant function analysis was exploratory (or "descriptive," see Stevens, 1996). It included a randomly selected sample ($n = 278$: $146 < \text{age } 15 \leq 132$) that was half of the total population of youth ($N = 542$) who reported their age. The second analysis was conducted to cross-validate the findings with the second half of the sample ($n = 264$: $142 < \text{age } 15 \leq 122$). All 13 of the factor-derived scales were included in each analysis to estimate whether mean levels of connectedness differed for preadolescents (under 15: middle school age) and adolescents (15 or older: high school age). The results suggested that age status could be reliably predicted as a function of these subscales. In both discriminant analyses a single discriminant function emerged. Ten of the 13 subscales had very similar correlations with the discriminant functions in the exploratory and confirmatory analyses. Table 3 presents the variable-function correlations, which serve as partial coefficients

removing the effects of the other variables. These are ordered from greatest to least in terms of which made the largest contributions to the discriminant function. The older adolescents were more connected to friends, peers, culturally different kids, and siblings, and they were less connected to the conventional worlds of school, religion, parents, reading, and teachers.

Finally, conventionality, as described by Jessor (1984), proved to be an important characteristic of adolescent connectedness. The composite scales were used in a confirmatory factor analysis to provide more stable estimates of the constructs reflecting conventional and unconventional connectedness. Given the differences found between preadolescents and adolescents, the sample included only the adolescents in high school (n = 433). One model was run in which each of the connectedness composite scales was loaded directly on one of the two latent variables, which were intended to reflect what Jessor (1993) described as conventional or unconventional behaviors and attitudes. The indicators of conventional contexts (school composite, family composite, reading subscale, and religion subscale) were loaded on the first factor, and the indicators of unconventional contexts (friends subscale and self subscale) were loaded on the second factor. The standardized solution illustrating factor loadings are presented in Figure 1. Model fit indices suggested the data fit the hypothesized model well (see Figure 1). One estimate of model fit, the χ^2/df statistic, tests the hypothesis that the model does indeed fit the data well. The χ^2/df was 3.44, which is inside the typically accepted cutoff range of 3 to 5 (Mueller, 1996), suggesting the model fit the data marginally well, but the Comparative Fit Index (CFI) = .96 provided evidence that the model provided an acceptable fit for the data. These findings suggest the connectedness scales can be characterized as reflecting primarily conventional or unconventional connectedness.

Discussion

Study one provided support for the first three hypotheses of the connectedness framework. Based on the results from study one, adolescent connectedness appears to differ from adult belongingness in that it is ecologically specific. As suggested by Baumeister and Leary (1995), youth's response to the need to belong may be characterized in terms of frequent action in and persistent caring for relationships and places in their social ecology. Evidence also was found for differences in adolescent connectedness between preadolescents and adolescents, as suggested by Sullivan (1953). Finally, confirming the work of Jessor (1993) and Hirschi (1969) conventionality seems to reflect an important dimension of adolescent connectedness.

Study Two: Cross Validating the Conventionality Dimensions of Ecological Connectedness

The goal of study two was to cross-validate the model in study one that tested the factors of conventionality. Conventionality is derived from problem behavior theory (Jessor, 1993; 1984) and social control theory (Hirschi, 1969), both of which suggest that unconventional relationships contribute to delinquent behaviors. To test whether this model would hold as well for delinquent youths as for preparatory school students, the model in study one was cross-validated with a second sample of delinquent youth.

Method

Design

Confirmatory factor analysis was conducted using the factor structure from study one which loaded all scales on the conventional or the unconventional latent variables (see Figure 1). As in study one, each scale was loaded directly on one of the two latent variables according to descriptions by Jessor (1993) and Hirschi (1969). Family, School, Religion and Reading were loaded on the conventional factor; Friends and Self were loaded on the unconventional factor.

Participants

The sample included 148 high school aged incarcerated delinquent youths (34% Caucasian, 23% African-American, and 43% Hispanic), 34% of whom were female. The sample of delinquent youth was detainees in a juvenile detention unit in the Southwest. Institutional or parental consent, and youths' assent to participate, were obtained prior to data collection.

Measures

Hemingway: Measure of Adolescent Connectedness (MAC version 2). The same measure and scales described in study one were used. Composite scales were computed as the means of all pooled items from related subscales (Family, School, Self and Friend) as in study one.

Procedures

Data were collected from the youth in small groups so that the researchers could read the connectedness scale aloud to the youth and answer any questions the youth had.

Results

The dimensions of conventionality were replicated with this divergent adolescent sample and provided further support for hypothesis three that conventionality is an important dimension of adolescent connectedness. For both groups the model had similar factor loadings. The smaller sample of delinquent youths had a nonsignificant Chi-squared estimate and the best fit indices (see Figure 1). Although the significance of the Chi-squared estimate for the preparatory school students may reflect the larger sample, it also may be that the conventionality dimension is more distinct and important in characterizing delinquent youths' connectedness.

Study Three: Using Connectedness to Explain Substance Use in Divergent Samples

Study three examined the use of the connectedness composite scales in explaining substance use in two divergent adolescent samples. A hypothesized model was developed to test hypotheses one (ecological differentiation) and three (conventionality predicts risk behavior) that risk-taking behavior, like substance use, can be explained in terms of involvement in the conventional and unconventional domains of school, family, and friends (Jessor 1993). This study tested the hypothesis that these conventional and unconventional worlds of connectedness make unique contributions to explaining whether or not youth report using cigarettes, alcohol, and marijuana (also see Bogenschneider et al. 1998; Kumpfer & Turner, 1990-1991).

Method

Design

A hybrid, latent variable model based on tetrachoric correlations for dichotomous variables (e.g., alcohol use: yes/no) was constructed using procedures for categorical analyses as recommended for EQS 5.7b for Windows (Bentler & Wu, 1995). The advantage of using this structural model instead of regression techniques is that the structural model tests the effects of both the separate indicators (subscales) and the latent variables (conventional connectedness; substance use) simultaneously as predictors of substance use. The chi-squared statistic tests the exclusion of any direct paths between the connectedness and substance use variables in model.

The model was constructed to test the hypothesis that separate, ecologically-specific connectedness effects (or paths) are required to fully explain substance use (hypothesis one and three). In model I (see Figure 2), connectedness to family and to school were loaded on the latent variable called conventional connectedness, which was used to predict a latent variable for substance use. Connectedness to friends, which alone represented unconventional connectedness,

was used to predict the latent variable for substance use independently. This model tested the hypothesis that both conventional and unconventional connectedness make unique contributions to the prediction of substance use. Covariances between the connectedness to school and to family were included to account for correlated error variance.

Participants

The sample included the 148 incarcerated delinquent youths in study two.

The rural sample included 209 adolescents in grades 9, 10, and 11 from a midwestern high school. This sample was 66% female and 5% ethnic minority (Hispanic, Native American).

Measures

Hemingway: Measure of Adolescent Connectedness (version 2 & 3). Version two was used with the delinquent youths, and a revised version three was used with a sample of rural midwestern youths. Version three included 50 items across the 13 domains of connectedness. Items were added to balance the number of conduct and caring items and to include a reverse scored item for each subscale to lessen response bias. Coefficient alpha for the items in each of the subscales included in the rural sample were School (α = .80), Teachers (α = .73), Parents (α = .81), Siblings (α = .76), and Friends (α = .66).

Risk & Prevention Questionnaire-Revised (RAP-Q) (Nakkula & Karcher, 1999; Way, Stauber, Nakkula, & London, 1994). Three dichotomously scored items were chosen from this questionnaire which asked about the use of three substances: cigarettes, alcohol, and tobacco. The questions asked whether youths had ever used each of the substances (no = 0; yes = 1).

Procedures

Data from the urban delinquent youth were collected in two ways. For the delinquent youth, the connectedness scale was administered in groups of five to six youth and was read

aloud. The substance use data was collected in a face-to-face interview. For the rural youth, both connectedness and substance use data were collected during one homeroom period. Institutional/school approval, parental consent, and youths' assent to participate in the survey were collected prior to data collection. Ninety-three percent of the delinquent youth, and 96% of the rural youth who were invited to participate completed both assessments.

Results

Connectedness was found to explain substance use in both samples, though to fully explain marijuana use additional paths were required. Table 4 presents Goodness of Fit indices for the theorized model (I), in which conventional and unconventional connectedness alone explained substance use, as well as for the two respecified models (II, III)(see Figure 2). The results of the Multivariate LM Test for the hypothesized model (I) suggested that a direct effect of connectedness to friends on marijuana use would increase model fit for the delinquent youths, so the theorized model (I) was respecified by adding this path. Model II, which included this direct path from connectedness to friends to marijuana use, provided a far better fit for the delinquent youths. Model II illustrated that the higher the level of conventional connectedness, the less likely the delinquent youths were to have used alcohol, marijuana, or tobacco. In addition, there was a direct effect of connectedness to friends on marijuana use but not on substance use in general.

The relationship between conventional connectedness and substance use among the delinquent youth was similar for the rural youths, but the relationship between connectedness to friends and substance use differed. The hypothesized model (I) did not provide a good fit for the rural youths, and although model II provided a better fit for the rural youths, considerable variance was unaccounted for by model II (see RMSEA estimate in Table 4). The Multivariate

LM Test suggested that an additional path from conventional connectedness to marijuana use would increase model fit. Indeed, model III provided an excellent fit to the data. This model suggested that, for the rural youths, conventional connectedness was negatively related to overall substance use. In addition there was an added, negative effect of conventional connectedness on marijuana use (beyond its effect on substance use in general). Unlike the delinquent youths, for the rural youths, increased connectedness to friends resulted in a significant increase in the likelihood of all substance use but not of marijuana uniquely. The path from connectedness to friends to marijuana use was nonsignificant for the rural youth.

Discussion

These findings suggest that for diverse groups of youths, connectedness is a significant predictor of substance use, but that the specific relationships between connectedness and substance use may differ across groups. As suggested by Jessor and Jessor (1977) conventionality is an important predictor of substance use in general. Conventional connectedness reduced the likelihood of substance use for both groups, but for delinquent urban youths, connectedness to friends only predicted marijuana use. Once the delinquents' connectedness to family and to school were accounted for, greater connectedness to friends increased their odds of marijuana use. This was not the case for the rural youth, for whom connectedness to friends did not have a unique effect on marijuana use, but rather conventional connectedness had an added effect on marijuana use. For the rural youths, greater connectedness to friends increased the odds of all three forms of substance use.

One considerable limitation of this study was that connectedness may have shared with substance use a common effect of age. Based on what was found in study one, conventional connectedness appears to be lower among older adolescents. Thus, without age in the model,

these models should be considered underspecified because the effects of age cannot be ruled out. Another limitation is that the rural youth used a more reliable measure of connectedness (one with the original items plus additional ones) which may mean that the error in the model for the delinquent youth reflects attenuated estimates that are less accurate than for the rural youth.

Despite this limitation, the study provided qualified support for the third hypothesis in the framework, suggesting that conventional connectedness is negatively related to substance use and unconventional connectedness is positively related to substance use. The qualifier is that the relationships between connectedness to friends and specific forms of substance use may depend on the type of youth and the context (i.e., rural or urban). Specifically, among delinquent youth connectedness to friends may be positively related only to more elicit substances, like marijuana use. For rural youth, connectedness to friends may increase the risk for all substance use.

Study Four: Assessment of Final Measure's Reliability and Composite Scale Factor Structure

Studies one through three revealed ways to improve construct validity and subscale reliability by indicating the types of items that should be included in the measure. Study three also indicated that the revised Connectedness to Friends composite scale was not sufficiently reliable. Revisions to the measure were made based on this information.

The present study focused on the psychometric properties of the fourth version of the measure of adolescent connectedness. The first purpose was to estimate the revised subscales' and composite scales' internal consistency, test-retest reliability, and convergent validity. The second purpose was to test the hypothesized connectedness model through a confirmatory factor analysis that included all 13 subscales as a final test of the ecological distinctiveness of connectedness.

Method

Design

A latent variable, confirmatory factor analysis was conducted using EQS 5.7b. Pearson correlations were used to estimate convergent validity of the subscales and composite scales.

Participants

The sample included (N = 427) youths from separate geographical regions and ethnic/racial groups. The sample included (a) 183 multiethnic high school students in grades 9 and 10 from an urban Midwestern city of approximately 290,000; (b) 153 youths in grades 8 through 12 at a college preparatory school in the Southwest (80 of whom served as mentors to children); and (c) 91 high school students in a rural school in a Midwest town of 15,000 (also mentors). The sample included 257 females and 170 males; 298 Caucasian, 47 African-American, 36 Hispanic, 17 Asian-American, and 29 bi-racial or "other" youths. The sample included balanced numbers of youths in grades 9 (32%), 10 (26%), 11 (23%), and 12 (19%).

Measures

Hemingway: Measure of Adolescent Connectedness (MAC version 4). Several changes were made from version three to four. Four items with poor interitem correlations in study three were replaced, and additional items were added so that there were six items per subscale. Based on study one, two changes were made in scale content. The future scale was revised to reflect a self-in-the-future subscale because of its high correlation with the connectedness to self scale. In the connectedness to culture subscale, items about knowledge of prejudice were removed based on their low item-total correlations, and additional items were added which asked only about interest in getting to know youths from other cultures or in making friends with youths from other cultures. Peer items were added to focus the scale more on youth's enjoyment of and

cooperation with their peers on school-related tasks. Interitem and test-retest reliability estimates for the subscales and composite scales are presented in Table 5.

School & Family Connectedness Scales (Jacobson & Rowe, 1999). Two additional scales used in published studies of connectedness were included. The purpose of their inclusion was to the estimate convergent validity of the items in fourth revision of the Hemingway connectedness measure. Cronbach's alpha reliability for the five items in the family connectedness scale (JR Family; $\alpha = .78$) and for the four items in the school connectedness scale (JR School; $\alpha = .72$) were good. JR was added to designate these connectedness subscales.

Reason for Living Inventory for Adolescents (Osman, et al., 1998). The 7-item Future Optimism subscale was chosen as a measure of future orientation. It was used to estimate the convergent validity of the Self-in-the-future subscale. Cronbach's alpha was good ($\alpha = .83$).

Family, Friends, Self Form (Simpson & McBride, 1992). This 60 item questionnaire assesses psychological adjustment as indicated by family relations, peer involvement, and self perceptions. The *friends* scale (FFFriends) measures one's level of activity with friends. The *conventional* involvement scale asks how many of one's friends engage in conventional behaviors, like reading, doing homework after school, wanting to go to college. Simpson and McBride reported internal consistency estimates between .73 and .92. Cronbach's alpha for the six conventional items ($\alpha = .69$) and five FFFriends ($\alpha = .76$) items was adequate in this sample.

Social Connectedness Scale II (Lee & Robbins, 1998). This 20-item scale measures a self-reported need for belongingness. The measure is based on research with college students and measures the absence of connectedness as indicated by difficulties in maintaining closeness with others in general. Cronbach's alpha reliability for the 20 items was high ($\alpha = .93$).

Inventory of Parent and Peer Attachment (Armsden & Greenberg, 1987; revised scale reported in Corcoran & Fischer, 2000). The full 75 item scale measures trust, communication, and alienation in parent and peer relationships. The seven items comprising the Alienation from Peers subscale were used in the current study. The authors report adequate three-week test-retest reliability (r = .86) and internal consistency (α = .72) estimates for adolescent samples. In the present study the interitem reliability was adequate as well (α = .75).

Results

The final measure appeared to have good properties of reliability. The data from the revised connectedness measure fit the cross-validation (ecological factor structure) model reasonably well with minor modifications. Correlations between other measures and the connectedness subscales and composite scales provided evidence of construct validity.

The theorized ecological model was conducted using confirmatory factor analysis. Based on the exploratory factor analysis presented in study one, the data were fit to the hypothesized model including five composite constructs for family, school, peers, self, and friends. In an attempt to include all subscales in the model, subscales for family related activities (i.e., religion) and school related activities (i.e., reading) were considered indicators of their respective factor. Finally, in this model, subscale error estimates ($\varepsilon = 1 - \alpha$) were used, based on Cronbach's alpha estimates presented in Table 5, to correct for attenuation due to subscale measurement error.

Initially the hypothesized cross-validation model did not provide a satisfactory fit for the data. The standardized solution parameter estimates are presented in parentheses in Figure 3. One estimate of model fit with complex models, the χ^2/df statistic, tested the hypothesis that the model does indeed fit the data well. The χ^2/df was 213/41 = 3.60, which is inside the typically accepted cutoff range of 3 to 5 (Mueller, 1996), suggesting the need to reject the hypothesis that

the model fit the data well was supported by the other goodness of fit indices. The NFI = .85, NNFI = .84, CFI = .87, GFI = .93, and AGFI = .89 also provided evidence that the model provided an unacceptable fit for the data. Nor was residual variance ideal, having a RMSEA = .08 with a confidence interval range of .068 to .091. The Lagrange Multiplier test indicated that two respecifications could achieve a satisfactory model fit. The new Self-in-the-future scale should also be loaded onto the School factor. The Connectedness to Neighborhood scale should also be loaded onto the Family factor. Unfortunately, these two additional paths undermined the orthogonality of the factor structure, even though each of the other subscales remained indicators of only one factor.

The respecified model, in which neighborhood connectedness and self-in-the-future were allowed to load on two factors, provided a good fit to the data. The standardized solution parameter estimates are presented outside of parentheses in Figure 3. The χ^2/df was 2.27, which was below the typical cutoff range of 3 to 5 for complex models (Mueller, 1996). The goodness of fit indices and reduced residual variance provided consistent evidence that the respecified model fit the data well (see Figure 3). The five factors had indicator subscales with moderate to large factor loadings (.34 to .82), except for the double-loaded subscales (neighborhood and self-in-the-future), which no longer loaded as heavily on their primary factors.

Psychometric properties of the measure were explored through a correlation matrix, which provided consistent evidence of convergent validity. Evidence of convergent validity (Campbell & Fiske, 1959) was gathered by asking 60 of the 9th and 10th graders in the Midwest school (sample group c) to complete an additional battery of measures including connectedness to school and family, activity with friends, social connectedness, conventionality, future

optimism, and peer alienation. The complete data from 57 of the youths are presented in Table 5. Bolded coefficients provide evidence of convergent validity.

Evidence of convergent validity was found for most of the revised scales, the composite scales, and for the dimension of conventionality. The JRFamily, JRSchool, and FFFriends composite scales correlated positively with ecologically related subscales from the measure of adolescent connectedness (MAC). The MAC family connectedness subscales and composite scale correlated highly with the JRFamily connectedness and the Conventional Activities scales with the exception that the MAC sibling connectedness subscale did not correlate with Conventional Activities. The JRSchool Connectedness scale correlated with the MAC conventional scales of connectedness to school, to teachers, and to self-in-the-future, but also with the unconventional MAC self-esteem, connectedness to friends, and connectedness to other cultures subscales. The Future Orientation convergence scale correlated highly with MAC self-in-the-future and other conventional connectedness scales. The Social Connectedness and Peer Alienation scales, which should reflect one's self-assessment based on perceived social support, correlated in the hypothesized directions with those MAC connectedness scales related to close interpersonal relationships and connectedness to self.

Using the more conservative significance level of .002, based on a Bonferroni adjustment of the conventional .05 level by the number of scales in the correlation matrix (.05/25 = .002), convergent validity remained significant for several scales. The Connectedness to Family, Friends, and Self composite scales correlated with their respective convergent validity scales, as did the Connectedness to Parents, School, Self-Esteem, and Self-in-the-Future subscales.

There were other correlations that did not support the hypothesized distinctions between MAC subscales. The MAC Connectedness to Reading subscale did not correlate with JRSchool

but rather with JRFamily. The MAC Connectedness to Self subscales (self-esteem and self-in-the-future) correlated with the JRFamily Connectedness, Future Orientation, and Conventional Activities scales but not with FFFriends. Neither the MAC Connectedness to Religion or Self-cohesion strongly correlated with any of the other scales rendering their validity unclear.

Test-retest and interitem reliability estimates were satisfactory. From the same 57 youths, the revised connectedness measure was collected twice, one month apart, to examine test-retest reliability (presented in Table 5). Also in Table 5 are estimates of internal consistency based on the total sample of 439 youths included in the confirmatory factor analysis. All but two of the scales demonstrated estimates of reliability in the good (.70 - .80) to very good (.80 - 90) range.

Study Five: Discriminant Validity Estimates of Final Hemingway Measure

The goal of the fifth study was to examine the effects of gender and delinquency status on adolescent connectedness to get estimates of discriminant validity. First, although consistent sex differences on connectedness in specific contexts (e.g., school and family) have not been reported in the literature, the majority of research on connectedness among late adolescents and adults has reported higher levels of connectedness among women (Guisinger & Blatt, 1994; Harter et al., 1997; Lang-Takac & Osterwiel, 1992; Rude & Burnham, 1995; Tolman, Diekmann, & McCartney, 1989). Finding similar effects among adolescents would suggest the *Hemingway* may measure an earlier state of the same phenomenon. We hypothesized greater conventional connectedness for girls than for boys as a function of family socialization and individuation processes. Second, central to Jessor's (1984) problem-behavior theory and Hirschi's (1969) social control theory is the argument that unconventionality contributes to delinquency. Delinquent youths should report lower conventional and higher unconventional connectedness.

Therefore discriminant validity was tested in terms of whether delinquent and non-delinquent youths would respond to the measure's subscales differently as predicted by these theories.

Method

Design

Between-group multiple analyses of covariance were conducted to test the effects of sex and delinquency status on the connectedness scales. Age was used as a covariate.

Participants

The first sample included boys and girls from both the rural Midwestern high school and the Southwestern preparatory school adolescents described in study four. They were 93% Caucasian and 7% African-American or Hispanic. The second sample included a random sample of 54 of the Midwestern high school boys (from sample one) to compare to 35 incarcerated male youths from a residential detention facility in the Midwest. There were 4 African American boys in the high school sample and 17 in the delinquent sample. The rest were Caucasian, and all were high school aged.

Measures

Hemingway: Measure of Adolescent Connectedness (MAC version 4). Subscale and composite scale names are presented in Table 5 with reliability estimates. Connectedness to Other Cultures, Religion, and Self-Cohesion were not included because of uncertain validity.

Results

The hypothesized effects of sex and delinquency status on connectedness were supported. Given age effects reported in study one, age was used as a covariate. As presented in table 6, separate 2 X 10 (group X connectedness scales) MANCOVAs controlling for age resulted in significant effects of both sex, $F(10,254) = 6.68, p \leq .0001$, and delinquency status, $F(10,67) =$

4.14, $p \leq .0001$. Adolescent females reported greater connectedness to their parents, teachers, school and to friends, but reported less connectedness to their neighborhoods than did boys. Delinquent boys reported less connectedness to teachers and to school but more connectedness to their siblings and neighborhoods than did boys in public schools.

General Discussion

These five studies revealed consistent support for the four adolescent connectedness framework hypotheses across ethnically and geographically diverse sample of youths. The findings suggest that the concept of an ecology of adolescent connectedness may provide a useful lens through which to view adolescent development and problem behavior.

The content of connectedness appears to reflect frequent activity with and consistent caring for other people and places in adolescents' lives, much as proposed by Baumeister and Leary (1995). Mature social cognitions did not factor heavily into adolescent's self-reported connectedness. Rather, across contexts, connectedness appears to reflect involvement in and caring for the relationships and contexts that are presented to adolescents, and reveals the intersection of two needs: to belong and to become.

Supporting Cooper et al.'s (1983) description of connectedness as a balance to individuation processes, successful development likely rests on the security of being consistently connected to the family but also on the establishment of connectedness outside the family as well. Study one suggests that adolescent connectedness differs as a function of context, age, and sex. Adolescents' connectedness appears to differ across contexts and relationships within the social ecology, and is probably not best characterized as a generalized feeling of belonging or relatedness. It appears that levels of adolescent connectedness change over time as adolescents mature and spend more time outside of the family and school. Study one found that older

adolescents report more unconventional connectedness. During adolescence youths appear to differentiate themselves from conventional connections with parents, schools, teachers, and conventional activities, like religion and reading, and invest more time in unconventional relationships and activities, like time with their friends and in their neighborhood.

Also consistent with prior research, between group comparisons reveal gender effects, with girls scoring higher on the conventional scales of school, teachers, parents, and much higher on their connectedness to friends than did boys. Boys reported greater connectedness only to the unconventional ecology of the neighborhood. This suggests that girls may be more involved in and feel more positively about conventional activities, people, and places than boys.

These studies provide support for both problem-behavior (Jessor & Jessor, 1977) and social control (Hirschi, 1969) theories and highlight the importance of understanding the role of conventional behavior and attitudes in adolescent development. Confirming both theories, delinquent youths reported less connectedness to the conventional worlds of school and teachers, and greater connectedness to siblings and neighborhoods, thus providing some evidence of the scales' discriminant validity and that connectedness to friends may be more reflective of activities in the unconventional context of the neighborhood and may serve as a risk factor for risk-taking behaviors. The predictive validity of the connectedness subscales also may differ across subgroups of youth. For example, although conventional connectedness served as a protective factor against substance use for all youth, connectedness to friends had a different relationship to marijuana use for delinquent and non-delinquent youth. Therefore, connectedness to friends may provide a target for intervention and prevention efforts.

There are a number of limitations to these studies. As it becomes more clear how connectedness differs as a function of other variables (e.g., in addition to age, sex, context, and

delinquency status), these variables should be included in future studies as control, moderating, and predictor variables. For example, in study five, girls reported more conventional connectedness. However, the sample included more girls who were volunteers (mentors), which may make them more likely to engage in conventional activities, such as at school, than might the non-volunteer boys in the study, or than might non-volunteer girls in the general population.

The conventionality distinction, defined as peer-mediated versus adult-sanctioned activities and relationships (Jessor & Jessor, 1977; Hirschi, 1969), was not as distinct in some worlds of connectedness as it was in others. For example, it remains somewhat unclear how best to characterize youths' connectedness to the neighborhood or to a sense of self in the future. The factor analysis in study four indicated that these scales reflect both conventionality and unconventionality. But zero-order correlations indicated neighborhood was more unconventional and future was more conventional. It might be that connectedness to the neighborhood changes as preadolescents move out of being neighborhood-bound toward becoming more mobile adolescents, or that connectedness to neighborhood is a function of family connectedness (e.g., Bogenschneider et al., 1998). Similarly, the connectedness to self composite scale may reflect both unconventionality (as demonstrated by its covariances with friends) and conventionality (as demonstrated by its covariances with family and school). Research on intervening or mediating variables may help to explain this overlap.

Another limitation is the need for evidence of multi-method validity. It may be that peer, parent, or teacher assessments of adolescent connectedness are more valid and reliable than are self-reports of connectedness. Yet parent assessments of connectedness and other methods of assessing connectedness will be required for such research (e.g., Bengtson & Grotevant, 1999; Clark & Ladd, 2000; Fishler et al., 1990).

Still much remains to be learned about the antecedents, correlates, consequences and nature of adolescent connectedness. It remains unknown how much connectedness is a state as opposed to a trait. Longer intervals for test-retest reliability estimates may reveal this and help to explain how malleable connectedness is to intervention. Yet it remains unclear whether interventions and prevention programs should attempt to promote conventional connectedness among adolescents, lessen or interrupt extreme forms of unconventional connectedness among adolescents, or to both.

A final question that should be explored is exactly how different are the early and later manifestations of connectedness? The answer to this question could have implications for research and interventions addressing adolescent risk-taking or promoting school achievement. Previous research, including attachment studies and risk-taking research, illustrates that the adolescent's sense of belongingness and relatedness likely reflects childhood attachment behaviors and social support during childhood (Ainsworth, 1989; Grotevant & Cooper, 1998). Does adolescent connectedness reflect direct extensions of attachment experiences, or are the influences of later peer bonding or other forms of social support in the schools and in secondary relationships equally important? Finally, do the sources of connectedness vary across the different worlds of connectedness?

Answering questions about the sources of connectedness may reveal the usefulness of connectedness as a predictor variable in research and as a target for intervention. As affective and behavioral engagement, connectedness may best be characterized as the adolescent's giving back to the environment, what Hirschi (1969) called commitment and involvement. Future research should test whether connectedness is a better predictor of aspects of social development or risk-taking than predictors such as attachment classifications or social support assessments.

The current set of studies highlight why connectedness has become an increasingly important construct in the study of adolescents' motivation, academic success, risk-taking, and psychopathology. Yet to date no validated self-report measures of the construct of adolescent connectedness have been reported in the literature. These five studies suggest that adolescents' connectedness is ecological, it changes over time and as a function of sex, it reflects a response to the need to belong, and it can be characterized in terms of conventionality. Capturing these dimensions in future research may help explain some of the reasons why some forms of connectedness, such as connectedness to friends, seem to serve as both risk and protective factors during adolescence. Together, these studies provide evidence that the adolescent connectedness measure and framework may be useful in future research on adolescent development.

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Table 1.

Exploratory Factor Analysis of Initial Connectedness Items

		Initial Factor Loadings									
Factor/Item	*Communality*	1	2	3	4	5	6	7	8	9	10
1. Teachers(con)	.52	**.59**									
Teachers(care)	.41	**.58**									
Future(care)	.20	**.58**									
School(cog)	.36	**.46**									
School(con)	.37	**.40**									
Peers(cog)	.31	**.37**									
School(care)	.59	.34				**.61**					
Future(con)	.52	**.30**									
Future(cog)	.32	.30		**.53**							
Peers(care)	.38	.30		**-.34**							
Teacher(cog)	.43	.21									
2. Sibling(con)	.62		**.77**								
Sibling(care)	.60		**.73**								
Sibling(cog)	.33		**.49**								
3. Religion(care)	.90			**.91**							
Religion(con)	.47			**.65**							
Religion(cog)	.36			**.54**							
4. Reading(care)	.75				**.84**						
Reading(con)	.49				**.66**						
Self-Cohesion(cog)	.33				**.45**						
Reading(cog)	.44				**.42**						

Table 1 (continued).

			Initial Factor Loadings									
Factor/Item	*Communality*	1	2	3	4	5	6	7	8	9	10
5. Self-Esteem(care)	.50					**.62**					
Self-Esteem(cog)	.41					**.40**	.39				
6. Neighborhood(cog)	.36						**.54**				
Neighborhood(con)	.34						**.54**				
Neighborhood(care)	.52						**.48**	.32			
7. Culture(con)	.28							**.47**			
Peers(con)	.23	.30					-	**.43**			
Culture(cog)	.15							**.31**			
8. Parents(care)	.74	.36							**.90**		
Parents(cog)	.41								**.70**		
Parents(con)	.99	.31							**.44**		
9. Self-Cohesion(care)	.48									**.61**	
Self-Cohesion(con)	.42									**.53**	
10. Friends(con)	.39						.33				**.49**
Friends(cog)	.19										**.32**
Friends(care)	.31										**.27**

Notes. Bolded indicates largest factor loadings. Only factor loadings greater than .30 are presented, except for Teacher(cog). Con = Conduct. Care = Caring. Cog = Social Cognition.

Table 2.
Higher Order Exploratory Factor Analysis

	Second Order Factor Loadings			
Items from Factor	1	2	3	4
One in Table 1	*School/Future I*	*School/Future II*	*Peers*	*Teachers*
School(care)	**.52**	.04	.20	- .04
Future(con)	**.50**	.10	.09	- .01
School(cog)	**.45**	.20	- .09	.09
Future(care)	**.42**	- .23	- .17	.17
Future(cog)	.13	**.52**	- .05	- .03
School(con)	- .02	**.43**	.02	.31
Peers(cog)	- .03	.03	**.51**	.08
Peers(care)	.20	- .17	**.46**	.10
Teachers(con)	.18	.06	.14	**.47**
Teachers(care)	- .03	- .00	.06	**.57**

Table 3.

Two Discriminant Analyses for the Effect of Age on Connectedness Subscales

	Discriminant Function—Subscale Correlations	
Connectedness Scale	*Sample A*	*Sample B*
Friends	.46	.43
School	- .46	- .48
Religion	- .33	- .26
Peers	.31	.15
Parents	- .22	- .18
Siblings	.19	.29
Self-Cohesion	.11	.05
Reading	- .09	- .08
Neighborhood	.08	- .16
Other Cultures	.07	.08
Teachers	- .06	- .06
Future	- .05	.09
Self-Esteem	.02	- .17
Statistical Criterion		
Sample (n = Younger/ n = Older)	146/132	142/122
χ^2 (df = 13)	44.22 ***	74.61***
Lambda (Λ)	.85	.75
Percent Correctly Identified	69%	73%

*** $p \leq .005$.

Table 4.

Goodness of Fit Indices for Cross-Validating Connectedness Models Explaining Substance Use

Model	*Goodness of Fit Indices for Basic and Alternative Models*	
	Sample A (n = 169) Urban Delinquents	*Sample B* (n = 209) Rural Students
I: Theorized Model (df = 6)		
Yuan-Bentler Corrected AGLS χ^2 (p-value)	15.53 (.010)	26.70 (.001)
CFI (AGFI)	.966 (.897)	.959 (.856)
NFI (NNFI)	.950 (.916)	.948 (.898)
RMSEA (Confidence Interval)	.102 (.045 - .161)	.127 (.079 - .178)
II: Model I Plus Direct Path from Connectedness to Friends to Marijuana Use (df = 5)		
Yuan-Bentler Corrected AGLS χ^2 (p-value)	3.69 (.594)	16.88 (.005)
CFI (AGFI)	.994 (.944)	.966 (.926)
NFI (NNFI)	.979 (.981)	.975 (.881)
RMSEA (Confidence Interval)	.049 (.000 - .125)	.107 (.054 - .165)
III: Model II Plus Path From Conventional Connectedness to Marijuana Use (df = 4)		
Yuan-Bentler Corrected AGLS χ^2 (p-value)	(N/A)	.557 (.968)
CFI (AGFI)	(N/A)	.998 (1.00)
NFI (NNFI)	(N/A)	1.00 (.990)
RMSEA (Confidence Interval)	(N/A)	.000 (.000 - .048)

CFI = Comparative fit index. AGFI = Adjusted GFI. NFI = Bentler-Bonett normed fit index. NNFI = Nonnormed fit index. GFI = Lisrel goodness of fit index. RMSEA = Root mean square error of approximation. 90% Confidence Interval = 90% confidence interval of RMSEA.

Table 5.

Validity Correlations, Internal Consistency, and Test-Retest Reliability for MAC Version 4

Hemingway Scales	*Convergent Validity Scales* (n = 57)							*Retest*	*Alpha*
	Family	*Conv*	*School*	*Friends*	*Future*	*SCII*	*Alien*	(n = 57)	(n = 439)
Composites									
Family	**.57****	**.26***	.19	.05	.28*	.40***	-.39***	.88	.87
Peers	**.41*****	**.28***	**.33***	-.11	.30*	.35**	-.30*	.81	.76
School	.45***	**.35*****	**.30***	-.12	.29*	.19	-.20	.87	.84
Friends	.17	.14	.29*	**.47****	.11	.50****	-.31*	.87	.82
Self	.54****	.35**	.31*	.09	.43***	**.56****	-.49****	.88	.82
Subscales									
Parents	**.63****	.39***	.21	-.06	.32*	.42***	-.44***	.72	.82
Siblings	**.35****	.10	.12	.21	.17	.32*	-.30*	.91	.94
School	.39***	.27*	**.45****	-.12	.28*	.39***	-.38****	.86	.75
Reading	.38***	.32*	.14	-.10	.22	.03	-.05	.88	.91
Teachers	.32*	.15	**.32***	-.24	.32*	.21	-.17	.73	.75
Peers	.35**	.33*	.20	.10	.16	.38***	-.55*	.80	.60
Friends	.05	.05	.28*	**.35****	.10	.39***	-.36**	.84	.84
Neighborhood	.21	.15	.21	**.38*****	.09	.42***	-.19	.89	.84
Self-Esteem	.45****	.29*	.30*	.13	.29*	**.56****	-.53****	.89	.82
Self-in-Future	.54****	.35**	.26*	-.00	**.54****	**.43*****	-.32*	.68	.68
Self-Cohesion	.13	.09	.09	.10	-.05	.10	-.23	.77	.89
Other Cultures	.32*	.29*	.37***	.05	.50****	.35**	-24	.80	.86
Religion	.09	.19	.18	.03	.21	.19	-.09	.89	.91

Notes. Coefficients in bold indicate convergent validity. *Family* = Family Connectedness, *Conv* = Conventional Activities, *School* = Connectedness to School, *Friends* = Activity with Friends, *Future* = Future Orientation; *SCII* = Social Connectedness, *Alien* = Alienation.

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .005$. **** $p \leq .001$

Table 6.
Means, Standard Deviations, and Multiple Analyses of Covariance Estimates for Effects of Sex and Delinquency on Adolescent Connectedness

Adolescent Connectedness Scale	*Sex Group* (N = 269)						*Boys' Delinquency Status* (N = 79)					
			Females (n = 160)		*Males* (n = 109)				*Non-delinquent* (n = 54)		*Delinquent* (n = 35)	
	F	(*eta*^{2})	*M*	*SD*	*M*	*SD*	*F*	(*eta*^{2})	*M*	*SD*	*M*	*SD*
Conventional												
Parents	4.68*	(.02)	3.99	.65	3.81	.77	.12	(.00)	3.78	.61	3.71	1.04
Siblings	.56	(.00)	3.70	1.05	3.60	1.02	10.73***	(.13)	3.33	.96	4.13	.76
Teachers	17.43***	(.06)	3.93	.61	3.57	.76	7.54**	(.09)	3.69	.71	3.12	.79
Peers	.04	(.00)	3.64	.59	3.63	.66	.67	(.01)	3.66	.65	3.50	.78
Reading	1.72	(.02)	3.43	1.14	3.25	1.09	2.83	(.04)	2.98	1.08	3.46	1.01
School	4.73*	(.02)	3.52	.66	3.32	.82	4.80*	(.06)	3.45	.65	2.95	1.10
Self-in-Future	1.43	(.01)	4.07	.65	3.97	.68	.04	(.00)	3.91	.59	3.87	.85
Unconventional												
Self-Esteem	.00	(.00)	4.13	.67	4.13	.57	.32	(.00)	4.16	.49	4.08	.66
Friends	25.92***	(.09)	4.29	.63	3.87	.70	.77	(.01)	3.84	.70	3.67	.72
Neighborhood	3.74*	(.02)	3.18	.92	3.39	.87	4.33*	(.05)	3.27	.84	3.72	.95

Note. *F* ratios are Wilks's approximation of *F*s. Analyses used age as a covariate. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .005$.

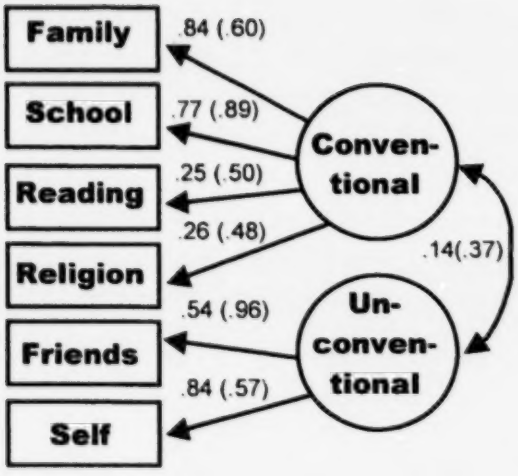

Figure Caption

Figure 1. Hypothesized model of conventional and unconventional dimensions of adolescent connectedness. Standardized parameters estimates before the parentheses are for adolescents in a preparatory school in study 1 (n = 433), and estimates in parentheses are for adolescents incarcerated in a juvenile detention unit in study 2 (n = 148). The model fits well for both groups, but was a better fit for the delinquent youths, $\chi^2 = 11.93$, $\chi^2/df = 1.49$ ($p \geq .05$), CFI = .98, and NNFI = .96, than for the preparatory school youths, $\chi^2 = 27.51$ ($p \leq .001$); $\chi^2/df = 3.44$, CFI = .96, NNFI = .93. All path coefficients are standardized and significant beyond .01.

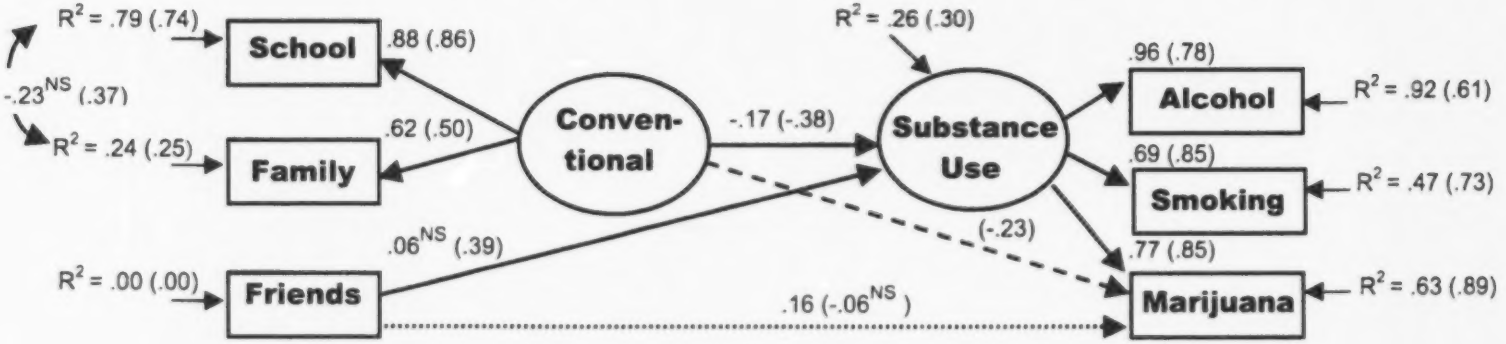

Figure Caption

Figure 2. Hybrid structural model using conventional and unconventional measures of adolescent connectedness to explain substance use among two divergent samples. Substance use was reported dichotomously (no = 0/yes = 1) so tetrachoric estimation procedures were used. Model I (solid arrows), the theorized model, was not a good-fitting model for either group. Model II (solid and dotted arrows) is the theorized model respecified to include a direct effect of Connectedness to Friends on Marijuana use (the dotted line). This model fit well for delinquent youths but not for rural youths. Model III is a respecified version of Model II that adds a direct effect of Conventional Connectedness on Marijuana use. Standardized solution estimates for the delinquent youths using Model II are before and outside the parentheses. Standardized solution estimates for the rural youths using Model III are inside the parentheses. All paths are significant unless identified by the superscript ^{NS}. Fit indices for all three models are presented in Table 4.

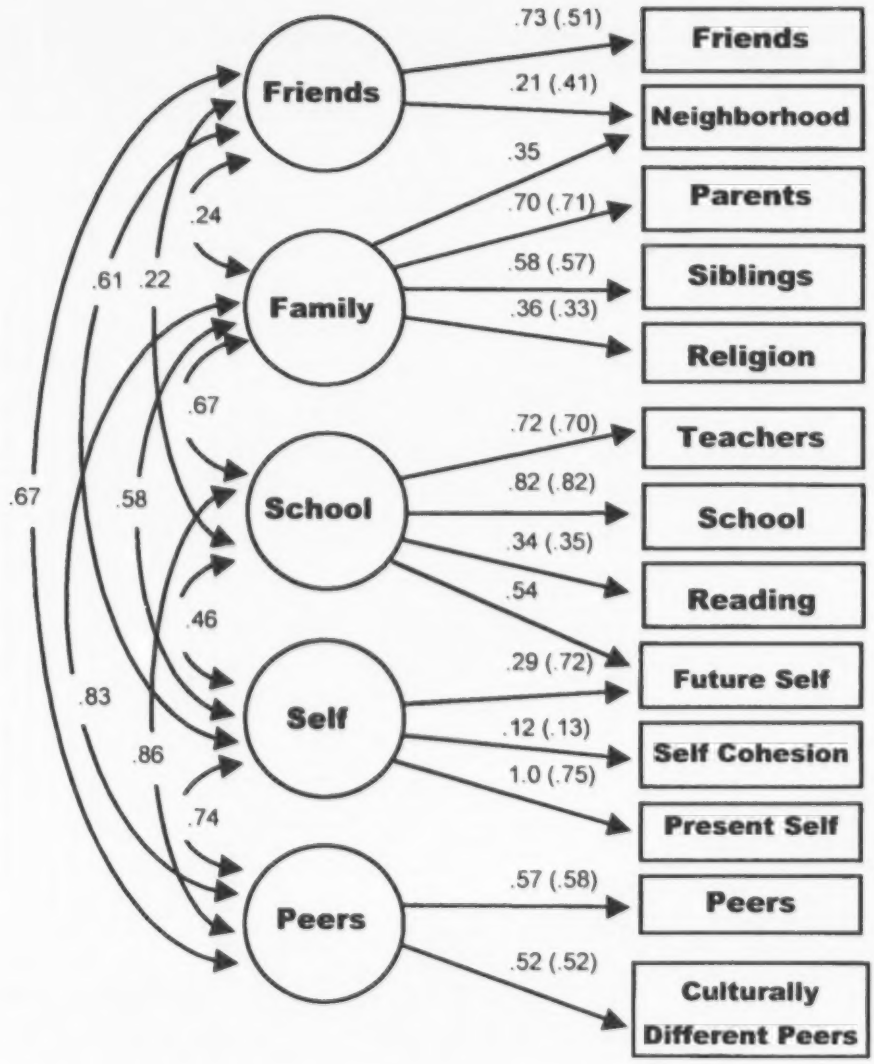

Figure Caption

Figure 3. Confirmatory factor analytic model for the Measure of Adolescent Connectedness (n = 440). All path coefficients are standardized. Coefficients in parentheses are for the hypothesized model, and those outside parentheses are for the respecified model. Goodness of fit indices for the respecified model: $\chi^2 = 120.14$ (df = 53); $\chi^2/df = 2.27$; CFI = .95, NFI = .91; NNFI = .92; GFI = .96; AGFI = .92; RMSEA = .056 (confidence interval = .042 - .069).

Scoring Instructions

Reverse score items 7, 11, 26, 28, 30, 34, 47, 49, 51, 59, 64, 69, 70, 72 by changing scores:

1 becomes 5, 2 becomes 4, 4 becomes 2, and 5 becomes 1.

Average items in each subscale to obtain a mean subscale score.

Subscale Mean Score Computations

Neighborhood (1 + 11 reversed + 21 + 31 + 41 + 51 reversed) ÷ 6

Friends (2 + 12 + 22 + 32 + 42 + 52) ÷ 6

Self-in-the-Present (3 + 13 + 23 + 33 + 43 + 54) ÷ 6

Parents (4 + 14 + 24 + 34 reversed + 44) ÷ 5

Siblings (5 + 15 + 25 + 35 + 45) ÷ 5

School (6 + 16 + 26 reversed + 36 + 46 + 53) ÷ 6

Peers (7 reversed + 17 + 27 + 37 + 47 reversed + 55) ÷ 6

Teachers (8 + 18 + 28 reversed + 38 + 48) ÷ 5

Self-in-the-Future (9 + 19 + 29 + 39 + 49 reversed) ÷ 5

Reading (10 + 20 + 30 reversed + 40 + 50) ÷ 5

Father (56 + 62 + 67 + 69 reversed + 74) ÷ 5

Mother (57 + 63 + 68 + 70 reversed + 75) ÷ 5

Culturally Different Youth (58 + 60 + 65 + 71) ÷ 4

Reaction to Disconnection (59 reversed + 64 reversed + 72 reversed) ÷ 3

Religion (61 + 66 + 73) ÷ 3

Hemingway: Measure of Adolescent Connectedness© (version 4.0)

"How TRUE about you is each sentence?" Not at all1 Not really2 Sort of true3 True4 Very true5

(1) I like hanging out around where I live (like my neighborhood).	1	2	3	4	5
(2) Spending time with my friends is the best part of my day.	1	2	3	4	5
(3) I can name 5 things that my friends like about me.	1	2	3	4	5
(4) I want my parents to be proud of me.	1	2	3	4	5
(5) I have a lot of fun with my brother(s) or sister(s).	1	2	3	4	5
(6) I work hard at school.	1	2	3	4	5
(7) My classmates bother me.	1	2	3	4	5
(8) I care what my teachers think of me.	1	2	3	4	5
(9) I will have a good life ahead of me.	1	2	3	4	5
(10) I enjoy spending time by myself reading.	1	2	3	4	5
	Not at all(1)	Sort of(3)			Very true(5)
(11) There's nobody I like spending time with around where I live.	1	2	3	4	5
(12) I have friends I'm really close to and trust completely.	1	2	3	4	5
(13) I am happy with the kind of person I am.	1	2	3	4	5
(14) It is important that my parents trust me.	1	2	3	4	5
(15) I feel close to my brother(s) or sister(s).	1	2	3	4	5
(16) I enjoy being at school.	1	2	3	4	5
(17) I like pretty much all of the other kids in my grade.	1	2	3	4	5
(18) I want to be respected by my teachers.	1	2	3	4	5
(19) Doing well in school will help me get the things I want out of life.	1	2	3	4	5
(20) I like to read.	1	2	3	4	5
	Not at all(1)	Sort of(3)			Very true(5)
(21) I get along with all the kids in my neighborhood.	1	2	3	4	5
(22) Spending time with my friends is a big part of my life.	1	2	3	4	5
(23) I can name 3 things that other kids like about me.	1	2	3	4	5
(24) I enjoy spending time with my parents.	1	2	3	4	5
(25) I enjoy spending time with my brothers/sisters.	1	2	3	4	5
(26) I get bored in school a lot.	1	2	3	4	5
(27) I like working on projects with the other kids in my classes.	1	2	3	4	5
(28) I dislike several of the teachers in my school.	1	2	3	4	5
(29) I do things outside of school to prepare for my future.	1	2	3	4	5
(30) I never read books in my free time.	1	2	3	4	5
	Not at all(1)	Sort of(3)			Very true(5)
(31) I often spend time playing or doing things in my neighborhood.	1	2	3	4	5
(32) My friends and I talk about personal things that are important to us.	1	2	3	4	5
(33) I really like who I am.	1	2	3	4	5
(34) My parents and I argue about things a lot.	1	2	3	4	5
(35) I try to spend time with my brothers/sisters when I can.	1	2	3	4	5
(36) I do well in school.	1	2	3	4	5
(37) I get along well with the other students in my classes.	1	2	3	4	5
(38) I try to get along with my teachers.	1	2	3	4	5
(39) I do lots of things in school to prepare for my future.	1	2	3	4	5
(40) I often read when I have free time.	1	2	3	4	5

Not at all(1) Not really(2) Sort of(3) True(4) Very true(5)

	Not at all(1)		Sort of(3)		Very true(5)
(41) I hang out a lot with kids in my neighborhood or city.	1	2	3	4	5
(42) I spend as much time as I can with my friends.	1	2	3	4	5
(43) I have special hobbies, skills, or talents.	1	2	3	4	5
(44) My parents and I get along well.	1	2	3	4	5
(45) I spend a lot of time with my brother/sister(s).	1	2	3	4	5
(46) I feel good about myself when I am at school.	1	2	3	4	5
(47) I often fight or argue with the other kids at school.	1	2	3	4	5
(48) I always try hard to earn my teachers' trust.	1	2	3	4	5
(49) Nothing I do now will have much of an affect on my future.	1	2	3	4	5
(50) For fun I read on my own at least once a week.	1	2	3	4	5

	Not at all(1)		Sort of(3)		Very true(5)
(51) My neighborhood is boring.	1	2	3	4	5
(52) My friends and I spend a lot of time talking about things.	1	2	3	4	5
(53) Doing well in school is important to me.	1	2	3	4	5
(54) I have unique interests or skills that make me interesting.	1	2	3	4	5
(55) I am liked by my classmates.	1	2	3	4	5
(56) I enjoy spending time with my father.	1	2	3	4	5
(57) I enjoy spending time with my mother.	1	2	3	4	5
(58) I like getting to know kids from other cultural or racial groups.	1	2	3	4	5
(59) I get very angry when people tease me or put me down.	1	2	3	4	5
(60) I like it when kids of different racial groups hang out with me.	1	2	3	4	5

	Not at all(1)		Sort of(3)		Very true(5)
(61) My religion is very important to me.	1	2	3	4	5
(62) My father and I are pretty close.	1	2	3	4	5
(63) My mother and I are pretty close.	1	2	3	4	5
(64) I get very angry when people criticize me.	1	2	3	4	5
(65) I would like to know more people from different cultural groups.	1	2	3	4	5
(66) I attend a religious service (like church) at least once a month.	1	2	3	4	5
(67) My father cares a lot about me.	1	2	3	4	5
(68) My mother cares a lot about me.	1	2	3	4	5
(69) My father and I argue a lot.	1	2	3	4	5

	Not at all(1)		Sort of(3)		Very true(5)
(70) My mother and I argue a lot.	1	2	3	4	5
(71) I like getting to know people who are culturally different from me.	1	2	3	4	5
(72) I get pretty upset when other people are mean or rude to me.	1	2	3	4	5
(73) I am a religious or faithful person.	1	2	3	4	5
(74) I talk with my father about very personal things and my problems.	1	2	3	4	5
(75) I talk with my mother about very personal things and my problems.	1	2	3	4	5

Not at all(1) Not really(2) Sort of(3) True(4) Very true(5)

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